Amendments to the Specification:

Please replace the paragraph beginning at line 21, page 4 and ending at line 4, page 5 with the following rewritten paragraph:

While synthetic peptides with amino acid sequences corresponding to the primary amino acid sequence at the phosphorylated sties of proteins have been found to serve as specific substrates for certain protein kinases, the degree of specificity of synthetic peptide substrates varies widely. A number of synthetic peptides act as substrates for multiple protein kinases. For example, phosphorylase kinase, protein kinase C, and the multi-functional ~~clad modulin~~calmodulin-dependent protein kinase all phosphorylate Ser^7 in a glycogen synthase peptide.

Please replace the first and second paragraphs, lines 1 through 6, on page 27 with the following rewritten paragraphs:

Figure 9 depicts the phosphorylation of recombinant protein substrates by purified human DNA-PK as anlyzed by SDS-PAGE. The upper portion is a ~~phosphoimage~~phosphorimage of the gel; the lower portion is two panels showing ~~Coosmassie~~ Coomassie blue stained images of regions corresponding to hsp90 and the recombinant substrates respectively.

Figure 10 depicts a ~~Coosmassie~~ Coomassie blue stained gel of the recombinant substrates of the present invention analyzed by isoelectrofocusing gel electrophoresis.

Please replace the paragraph located at lines 15-19, page 52, with the following rewritten paragraph:

As previously described, the protein substrates encoded by the recombinant genes may also include two additional ~~facilitory~~ facilitating elements. These additional ~~facilitory~~ facilitating elements of the protein substrates are: (1) an epitope for affinity purification of the substrate; and (2) a site that permits cleavage (excision) of the segment of the protein substrate containing the phosphorylation site.

Please replace the paragraph located at lines 1-8, page 54, with the following rewritten paragraph:

The protein substrate can also be partially purified utilizing the epitope tags for affinity purification if necessary. This is done if an insufficient amount of protein substrate required for easy detection is ~~not~~ expressed in the cells, or if removal of proteins other than the protein substrate is desired. In a preferred embodiment, the epitope is a sequence of amino acids which allow immobilized metal affinity purification. In a most preferred embodiment, six consecutive histidine (His) residues are inserted after the N-terminal phosphorylation site segment to provide the epitope.

This allows purification with immobilized metals such as Nickel (Ni) or Zinc (Zn).

Please replace the paragraph located at lines 5-14, page 57, with the following rewritten paragraph:

The method for identifying agents that alter either intracellular protein kinase or intracellular DNA-PK activity is identical to the method of monitoring activity except for an additional step. The cells are contacted with agents that may alter protein kinase or DNA-PK activity. This procedure is basically the same as in the method for detecting substances that alter the activity of DNA-PK *in vitro*. In a second embodiment of the method, cells may be treated with an agent that activates the protein kinase or DNA-PK, then the cells are contacted, either before or after, with an agent that may inhibit activation of the protein kinase or DNA-PK. The amount of phosphorylated substrate in the treated cells is then compared to the amount of phosphorylated substrate in control (i.e., non-contacted) cells~~, i.e., non-contacted cells~~ containing the protein substrates.

Please replace the paragraph beginning at line 20, page 60, and ending at line 2, page 61 with the following rewritten paragraph:

The following examples are provided to further illustrate the present invention. Examples 1-8, are provided to illustrate protocols ~~in preparing~~ useful in the preparation of the materials needed for the present invention. Examples 9-14 specifically illustrate preferred embodiments and methods of using the present invention. Examples 15-17 illustrate the preferred additional embodiments of the present invention utilizing expression vectors which encode the recombinant protein substrates for DNA-PK.

Please replace the paragraph located at lines 4 through 20, page 86, with the following rewritten paragraph:

Mouse L 929 cell extracts did not appear to contain DNA-PK. (SEQ ID NO: 11) was phosphorylated at a rate that was at least 100 times lower than the rates at which it was phosphorylated by the human cell extracts. This result is consistent with the previous observation that mouse L 929 cell extracts did not phosphorylate hsp90 in a DNA-dependent manner. L 929 cell extracts also lacked a 350-kDa polypeptide that reacted with the anti-DNA-PK antibody. These results indicate that mouse L 929 cells have little DNA-PK activity

compared with the cultured human cells that have been examined. Several other rodent cell lines, including SV40-transformed BALB/c mouse embryo fibroblasts and secondary rat embryo fibroblasts, also had little if any DNA-PK activity. Rodent cell extracts are well-known to have other kinases, including casein kinases I and II. Therefore, these results also demonstrate that (SEQ ID NOS: 11 and 20) are not effective substrates for the common kinases of mammalian cells. Thus, (SEQ ID NO: 11) represents a specific peptide substrate for detection and quantitation of DNA-PK activity in cell extracts and other biological samples. It is expected that the previously discussed derivatives of (SEQ ID NO: 11), (SEQ ID NOS: 12, 14, 15, 18 and 19), are also specific peptide substrates for detection and quantitation of DNA-PK activity in ~~cellll~~ cell extracts and other biological samples.

Please replace the paragraph located at lines 1 through 12, page 88 with the following re-written paragraph:

The amount of phosphate incorporated was calculated from the specific activity of the ATP. The rate of phosphate incorporation into the Ser-Gln-Glu peptide (Table 1) (SEQ ID NO: 11) in the presence of calf thymus DNA was approximately linear throughout the 10 minute reaction incubation period.

Parallel assays were performed without added peptide, and these background values were subtracted to produce the activities that are shown in Table 3. Background values varied but, in all cases, were less than 0.2 nmol/min/~~ml~~mg (a few percent of the activity present in human cells). The specific activities were calculated from the total activity in the two fractions divided by the total protein in the two fractions. The percent of total DNA-PK activity in the S10 and P10S fractions was determined with peptide (SEQ ID NO: 11) in the presence of added calf thymus DNA. Extracts without substantial DNA-PK activity were examined for their ability to inhibit purified DNA-PK. Inhibitory activity was not detected.